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Agenda

- Bluetooth Architecture in Windows
 - Goals
 - Components of the Stack
 - Functionality
- Opportunities for IHWs and ISVs
 - Applications
 - Services
 - Devices

High Level Goals

- PC work with all devices
 - Bluetooth Devices as PC peripherals
 - Bluetooth Devices as PC companions
 - Bluetooth Devices bridge to network resources through a PC
- Easy to configure and operate
- Extensible architecture
 - Platform for third parties to add value

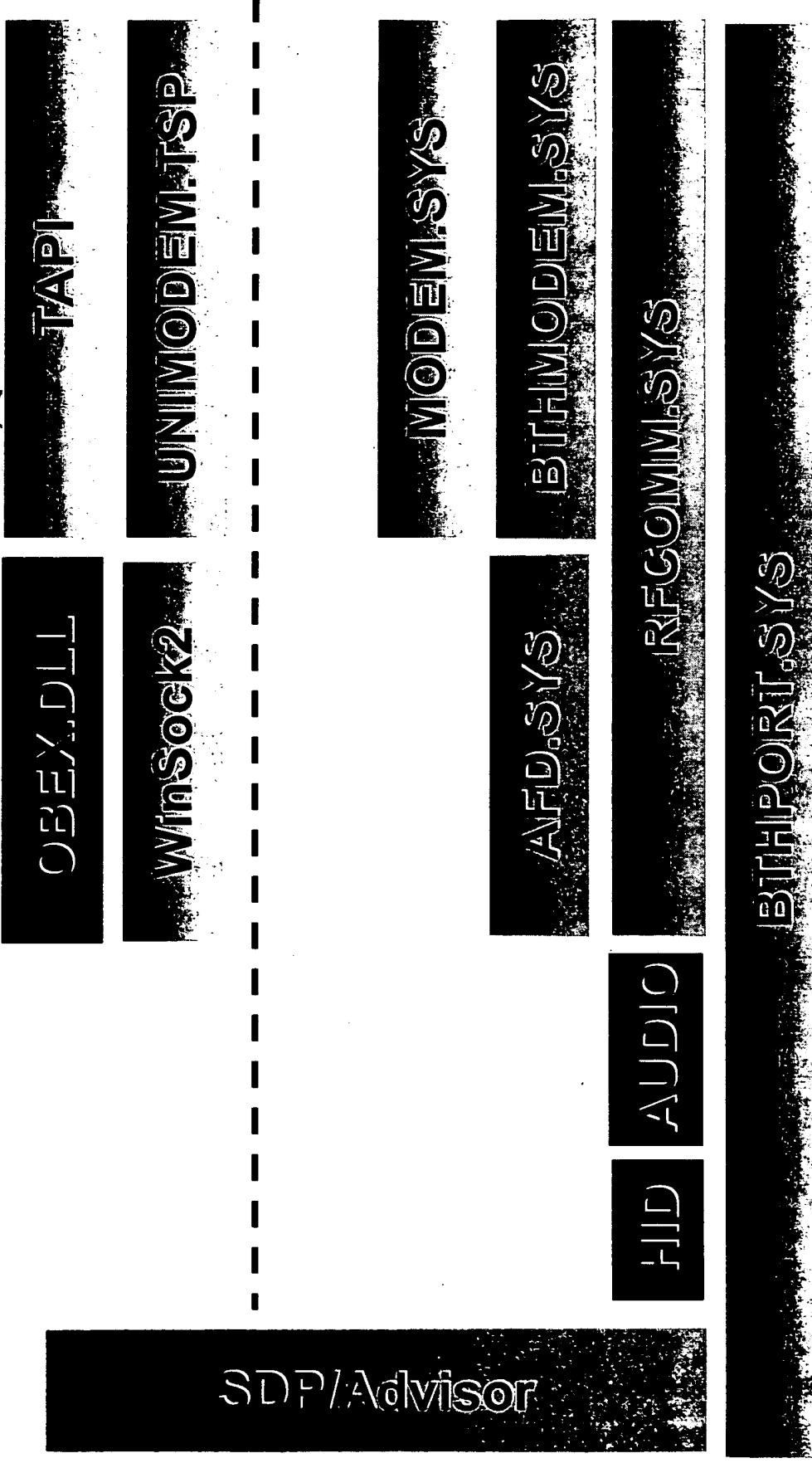
Scenarios

- Device configuration:
 - Discovery
 - Bonding
- Syncing and transfer through OBEX
 - Files
 - Pictures
 - Vcards
- Dial up Networking
 - Cell as modem
 - Null Modem for Peer to peer
- Generic RFComm applications
 - Non-OBEX synchronization
 - Other serial-type applications

Technical Requirements

- Bluetooth 1.0 Type II device classification supported
- Required profiles
- Bus Management Infrastructure
 - Device and radio configuration
 - Control panels
 - System Trays
- Extensible framework for value adds
 - Devices
 - Profiles
 - Bus mgmt software
 - RFComm applications
 - Object Exchange and special object handling
 - RAS and TAPI over Unimodem

Bluetooth Stack Diagram



Stack Components

- BthPort
 - L2Cap / HCI
 - Hardware abstraction: Serial, USB...
 - Enumeration of Found Bound Services
- SDP/Management UI
 - Bus management:
 - User notification of newly discovered devices
 - User assisted Configuration and Bonding
 - Configuration of radio
 - Local Service Exposure and Publication

Stack Components

- RFCOMM
 - RFComm Profile
 - TDI interface for WinSock (AFD)
 - Bus enumeration for DUNs
- BthModem (a WDM modem)
- OBEX.DLL
 - Object Exchange 1.2
 - Bus Agnostic

BthPort

- Support Currently Defined buses: USB, Serial, 16550
- Plug and Play events
- Bluetooth Request Blocks

SDP

- Provide a “builder” interface to easily create a service record
- Kernel mode
 - Client drivers can submit a list of UUIDs to search for on all newly discovered devices or initiate a SDP search outside of device discovery
 - BThPort will search for all the services in the browse group hierarchy
- User mode
 - Initiate searches
 - Browse service records

Management UI

- Present user with devices in range and bound devices
- Allows the user to easily change the relationship with remote device
- Provide unobtrusive PIN and authorization notifications
- UI is accessible from third-party applications for a standard user experience
- Advanced features
 - Filter devices based on COD or address
 - Local radio settings
 - Manage power policies

OBEX

- Full OBEX 1.2 implementation:
 - Put
 - Get
 - SetPath
 - Definable transactions
- COM API
- Extensible to other media and transports

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OBEX

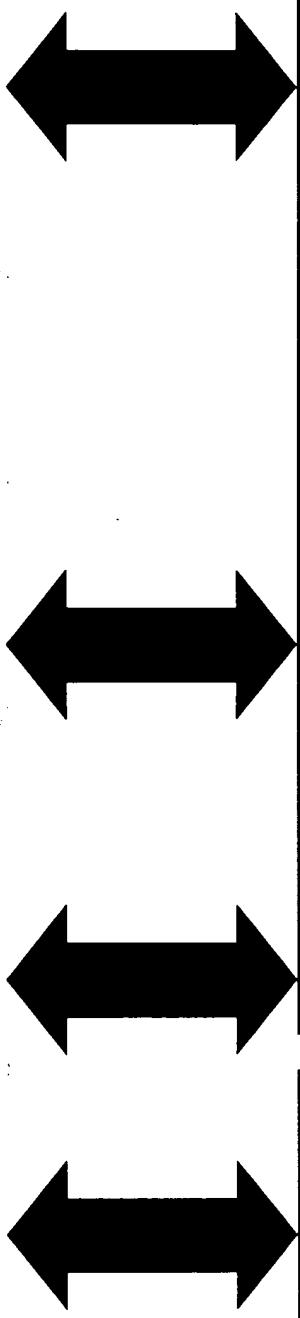
OBEX.DLL

OBEXBT.DLL

OBEXIRDA.DLL

OBEXIP.DLL

?



SDP

WINSOCK 2

RFCOMM

Modem.SYS

OBEX

BITTSSER.SYS

WIN32K//AFD//TDDI



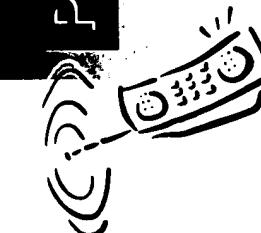
FDJO

RFCOMM.SYS

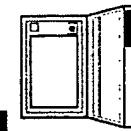


FDJO

BITTPORT.SYS



FDJO



DUN/Lan Access

File Transfer/OBEX

Opportunities To Add Value

- RF comm applications
- OBEX applications/extensions
- Bluetooth management application
- New device types and/or class drivers
- Radios on new hardware buses

RF Comm Applications

- Applications looking for virtual serial ports not supported
- Legacy TAPI/Unimodem applications see peer devices as NULL Modems
- Applications enumerate Modem/Serial Devices through Unimodem

RF Comm Applications

- Winsock allows for dynamic discovery and communication
 - Talk to the device, not to the conduit (“My Laserjet” versus LPT2)
 - Once bonded device is in range the application can find and use it
 - Allows for multiple remote connection to same service
 - Not necessary to manage multiple virtual COMx ports

OBEX Applications

- Examples
 - Photos
 - Vcards (not “in the box”)
 - Simple databases
- Server
 - Registration
 - New Obex Commands and types
 - Application can register as handler for custom commands
- Client
 - Discovery
 - Navigate directory structure (enumerate objects)
 - Push Pull objects

Bluetooth Management Applications

- Substitution of stock Microsoft Plug and Play experience
 - Configuration and bonding of devices

New Profiles Types

- Native L2CAP
- Examples:
 - HID
 - Remote NDIS
 - Doom Server with Streaming Audio (utilize native audio channels)

New Profile Types

- Server
 - Registers with SDP/Adviser module
 - No Plug and Play event until remote peer connects
 - PDO means active connection on which local server driver loaded
- Client
 - BthPort finds remote service
 - Signals SDP/Advisor to determine if user wants to use this device (Approval Wizard)
 - Plug and Play event (PDO) means active connection on which local client driver loaded

New Hardware Buses

- Examples
 - Register set for Card Bus/PCI
 - 1394
 - Miniport

Calls To Action

- Is your value add method missing?
- We need your hardware
 - Phones
 - Radios
 - Phones
 - Peripherals
 - Phones
 - PDAs
- We need your software
 - Applications and drivers
 - Can we upgrade you?
- Come to the developers' conference

References

- <http://www.microsoft.com/hwdev/bluetooth>
- Contact: BTINFO@Microsoft.COM

Windows® HEC 2000

Windows® Hardware Engineering Conference

TEXAS
INSTRUMENTS
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 - Registration

- Beta test our software
 - Learn first hand what is intuitive, and what is not
 - Which features should be more readily available
 - Which features are rarely used
- Provide us feedback
- Provide us hardware
 - Allows us to test the user experience with a wide range of scenarios

- New Obex Commands and types
- Application can register as handler for custom commands
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 - Discovery
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 - Push Pull objects
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